

ABSTRACT OF THE DISCLOSURE

Insulated gate field effect transistors having gate electrodes with at least two layers of materials provide gate electrode work function values that are
5 similar to those of doped polysilicon, eliminate the poly depletion effect and also substantially prevent impurity diffusion into the gate dielectric. Bi-layer stacks of relatively thick Al and thin TiN for n-channel FETs and bi-layer stacks of relatively thick Pd and thin TiN, or relatively thick Pd and thin TaN for p-channel FETs are disclosed. Varying the thickness of the thin TiN or TaN layers between a first
10 and second critical thickness may be used to modulate the work function of the gate electrode and thereby obtain the desired trade-off between channel doping and drive currents in FETs.